



**TRANSMISSION / DISTRIBUTION PROJECTS**

**COMPANY:EGSI -LA**

**CUSTOMER: CLECO POWER LLC**

**FACILITIES STUDY**

**EJO # F4PPGS0419**

**ICTT-2008-012**

**TRANSMISSION SERVICE REQUESTS**

**OASIS 1543621**

**Revision: 1**

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**Table of Acronyms**

<b>A</b>	<b>Amps</b>
<b>ACSR</b>	<b>Aluminum Conductor Steel Reinforced</b>
<b>ACSS</b>	<b>Aluminum Conductor Steel Supported</b>
<b>ADEQ</b>	<b>Arkansas Department of Environmental Quality</b>
<b>AEPW</b>	<b>American Electric Power West</b>
<b>AFUDC</b>	<b>Allowance for Funds Used During Construction</b>
<b>ANO</b>	<b>Arkansas Nuclear One</b>
<b>ATC</b>	<b>Available Transfer Capability</b>
<b>CLECO</b>	<b>Central Louisiana Electric Company</b>
<b>CSWS</b>	<b>Central &amp; Southwest Control Area</b>
<b>EES</b>	<b>Entergy Control Area</b>
<b>EHV</b>	<b>Extra-High Voltage</b>
<b>ICT</b>	<b>Independent Coordinator of Transmission</b>
<b>kV</b>	<b>Kilo-Volt</b>
<b>MCM</b>	<b>(M) Thousand Circular Mils</b>
<b>MDEA</b>	<b>Mississippi Delta Energy Agency</b>
<b>MEP</b>	<b>Mississippi Electric Power</b>
<b>MPS</b>	<b>Missouri Public Service</b>
<b>MVA</b>	<b>Mega-Volt Amp</b>
<b>MW</b>	<b>Mega-Watt</b>
<b>NPDES</b>	<b>National Pollution Discharge Elimination System</b>
<b>NOI</b>	<b>Notice of Intent</b>
<b>OASIS</b>	<b>Online Access and Same-time Information System</b>
<b>OATT</b>	<b>Open Access Transmission Tariff</b>
<b>OH</b>	<b>Overhead</b>
<b>OG&amp;E</b>	<b>Oklahoma Gas &amp; Electric</b>
<b>POD</b>	<b>Point of Delivery</b>
<b>POR</b>	<b>Point of Receipt</b>
<b>SOC</b>	<b>System Operations Center</b>
<b>SHPO</b>	<b>Arkansas State Historic Preservation Office</b>
<b>SHV</b>	<b>Super High Voltage</b>
<b>SW</b>	<b>Switch Station</b>
<b>SWEPCO</b>	<b>Southwest Electric Power Company</b>
<b>TGU</b>	<b>Tax Gross Up</b>
<b>TOC</b>	<b>Transmission Operations Center</b>

**Entergy Transmission Facilities Study  
OASIS Request Number 1543621  
Transfer from CLECO to Louisiana Generating LLC**

## **1. EXECUTIVE SUMMARY**

The purpose of this Facilities Study is to determine the availability of transfer capability across Entergy's transmission system from CLECO to Louisiana Generating LLC (LAGN), to evaluate the CLECO request for 162MW of yearly network transmission service. The time period for this transfer is from 1/1/2010 until 1/1/2019. The direction of the transaction is CLECO to LAGN. This study was performed on the latest available 2010-2017 summer peak cases and 2009-2016 winter peak cases using PSS/E and MUST software by Power Technologies Incorporated (PTI).

Some of the upgrades detailed in this facility study were identified in a higher queued Transmission Service Request. The OASIS numbers, for those requests, are listed with each upgrade. If that prior request is not confirmed, responsibility for funding this upgrade (in accordance with Entergy's OATT) will be required under this request. If the prior request is confirmed and the customer enters into a Transmission Service Agreement with Entergy, the responsibility to fund the upgrade will be a requirement under the prior request; however the funding party will have Financial Transmission Rights (FTRs) to any additional capacity created by the upgrade in accordance with Attachment T to Entergy's OATT. Use of any available capacity created as a result of that upgrade will require payment to the funding party for use of those FTRs in accordance with Attachment T.

The facilities study identifies any transmission constraints resulting from the requested power transfer. The facilities study also includes cost estimates to correct any transmission constraints.

Under Entergy's Independent Coordinator of Transmission which became effective on November 17, 2006, Entergy will recover these costs based on the Attachment T to Entergy's OATT. In this Attachment T, the ICT has determined these costs to be classified as Supplemental Upgrades.

## **2. SAFETY AWARENESS**

Safety is a priority with Entergy. Safety will be designed into substations and lines. The designs will be done with the utmost safety for personnel in mind for construction, operation, and maintenance of the equipment.

Should the work contained within this Facility Study be approved, a detailed Safety Plan will be formulated and incorporated within the project plan.

All employees working directly or indirectly for Entergy shall adhere to all rules and regulations outlined within the Entergy Safety manual. Entergy requires safety to be the

highest priority for all projects. All Entergy and Contract employees must follow all applicable safe work procedure

### 3. SCOPE SUMMARY

The Facilities Study has identified some transmission constraints. The constraints can be addressed in the following manner:

#### 3.1 Install a 2<sup>nd</sup> 300MVA, 230/115kV autotransformer at Winnfield.

The Winnfield 230/115kV autotransformer overloads for the loss of the Montgomery-Clarence 230kV transmission line. It is required that a 2<sup>nd</sup> 300MVA, 230/115kV autotransformer at Winnfield be installed.

This upgrade has been included in a previous facility studies (OASIS request number #1543616). If this prior facility study is confirmed, the customer would not have to fund this upgrade.

#### 3.2 Build a 2<sup>nd</sup> Moril-Hopkins 138kV transmission line.

A 2<sup>nd</sup> Moril-Hopkins 138kV transmission line is required to eliminate the thermal constraints listed below. The new Moril-Hopkins 138kV line is to have a rated capacity of at least 288MVA.

The Hopkins 138kV substation is owned by CLECO and associated costs will have to be obtained from the owner.

#### Thermal Constraints

Limiting Element	Contingency Element
Duboin-Bayou Warehouse 138kV Moril-Duboin 138kV Bayou Warehouse-Ivanhoe 138kV	Moril-Hopkins 138kV
Moril-Hopkins 138kV	Bayou Warehouse-Ivanhoe 138kV
Duboin-Bayou Warehouse 138kV	Patoutville-Teche 138kV

#### 3.3 Upgrade the line equipment at the Ray Braswell 500kV and Baxter Wilson 500kV substations.

The Ray Braswell-Baxter Wilson 500kV transmission line overloads for the loss of the Grand Gulf-Franklin 500kV transmission line. The Ray Braswell-Baxter Wilson 500kV transmission line needs to have a capacity of 1768MVA or greater on all components. The line conductor has a rated capacity of 2884MVA, but the Ray Braswell 500kV breakers #J4928 and #J4920 and switches #J4919, #J4921, #J4927, and #J4929 and the Baxter Wilson 500kV breaker #J2230 and switches #J2228, #J2229, #J2232, #J2234, #J2249, and #K2283 are rated at 2000A or 1732MVA. The breakers and switches need to be upgraded to 3000A.

## 4. SCOPE DETAILS

### 4.1 Winnfield Substation:

Add a second 230/115 kV, 300 MVA transformer

#### 4.1.1 Winnfield Substation 230 kV

Install one 230/115 kV 300 MVA transformer along with breakers per the station one line L0039S05 and electrical arrangement. Extend the existing 230 kV operating bus and build new transformer bay.

#### Site:

The following material is required to expand the site by 48 feet to the East.

- 700 cubic yards of excavation
- 1 site survey
- 1 soil boring
- 350 cubic yards – stripping topsoil
- 1400 cubic yards of fill
- 1 acre of soil sterilization
- 650 tons of limestone
- 48 feet of additional roadway
- 416 feet of new fence
- 320 feet – removal of existing fence

#### Foundations:

Extend existing cable trough 100ft, poured in place.

The following foundations will be installed to facilitate the substation addition.

- One (1) 230kV transformer foundation
- One (1) Oil containment for 230kV transformer
- Thirteen (13) 230kV Low elevation bus support foundations
- Two (2) 230kV Breaker foundations
- Two (2) 230kV High Elevation Switch support foundations
- Two (2) 230kV Full Tension Deadend foundations
- Two (2) 230kV Equipment support pedestal foundations

#### Electrical:

Add transformer bay, transformer and extend operating bus per station oneline L0039S05 and electrical arrangement. Extend existing operating bus 96 ft. In Transformer bay #1 install one breaker, one switch on existing switch structure

In Transformer bay #2 install one breaker, two switches with switch structures, two deadend structure, and one Autotransformer. The following material is required:

- One (1) auto transformer, 230/115kV, 180/240/300MVA, 3 phase, 6.2% or less impedance, with surge arresters.
- Two (2) breakers 230kV, 2000A, 40kA
- Three (3) disconnect switches, 230kV, 2000A, manually gang operated including one with ground.
- Structures:

Two (2) 10AS deadend structures including one with 230kV bus support bracket

- Two (2) Switch support structures, high elevation.
- Five (5) three phase bus supports
- Two (2) CVT support structures

### **Assumptions:**

Fault current does not exceed 40kA

Control house does not require expansion.

### **Relaying:**

230kV Autotransformer Protection:

- Install two (2) Autotransformer Differential Relay Protection panels. The new protection panel will use SEL 387 differentia protection for primary and an Nxtphase T-pro protection backup
- Install two (2) 230kV CVT and Junction Box

230kV Bus Protection/Control:

- Install one (1) panels with SEL 487B differential protection

### **Breaker Protection/Control:**

- Install two(2) Breaker Control Panel The panel will use an SEL 351
- Install control cables to breaker.

### **Motor Operator Switch/ Control:**

- Install one (1) Motor Operator Switch Control Panel
- Install control cables to MOS.

### **Control House Equipment:**

- Upgrade RTU And Termination Cabinet Status cards & Control cards
- Install one (1) Communications Processor, Orion 5r
- Marshalling Cabinet
- One Lot of ADSS Fiber Optic – Autotransformer Protection
- One Lot of Control Cable

**Long delivery items:**

Quantity	Material Description	*Lead Time (weeks)
1	Autotransformer, 230/115kV, 180/240/300MVA, 3 phase unit	82
2	230 KV Breaker control panel	16
3	Diff Panels	16
2	230kV CVT	24
2	230kV Breakers	22
3	Disconnect switches	18
1 lot	Steel Structures	20
3	Arresters	16
1 lot	Insulators	14
1 lot	Buswork	14

**RTU configuration and settings:**

Settings for all new relays and surrounding area would be required as well as development of configuration for RTU for additional status, control and indications

**Construction methodology and outages required:**

Grading work and fence expansion will be required to enlarge site. Foundation work may require some short outages to existing autotransformer bank but this will depend on final foundation design. The majority of the electrical construction can be completed without outages. An extended outage of at least 2 weeks will be required to tie-in new construction. In order to keep this outage to a two week minimum the plan will most likely include connecting and tying in the new (No. 2) autotransformer and get it energized. After the new autotransformer is energized, then some additional work to get the existing autotransformer reconnected and in-service can be completed. Relay work will be required to tie in the new autotransformer and for the new configuration of the existing transformer.

**Assumptions:**

None provided

**4.1.2 Winnfield 115 kV:**

The scope of this work is to install breakers to terminate existing and new transformer 115 kV secondary side. There is no room to install a new bay at the station. A capacitor bank will be relocated to make space for a new bay to install a breaker and terminate the 115kV secondary side as shown on L0444SO5 and the electrical arrangement.

**Site:**



The following material is required to expand the site to include the new capacitor bank.

- 360 cubic yards of excavation
- 180 cubic yards – stripping topsoil
- 720 cubic yards of fill
- 1 acre of soil sterilization
- 1 site survey
- 1 acre seed and mulch
- 144 feet of new fence
- 48 feet – removal of existing fence

### **Foundations:**

The following foundations will be installed to facilitate the substation addition.

- One (1) 115kV breaker foundation
- Five (5) 115kV equipment support foundation
- Three (3) 115kV high elevation bus support foundations
- Six (6) 115kV low elevation bus support foundations
- One (1) 115kV Capacitor bank foundation
- Four (4) 115kV High Elevation Switch support foundations
- One (1) Full Tension Deadend foundations

Grounding will be installed to expand the ground grid for the capacitor bank installation and connect ground leads to equipment and structures list in the electrical detailed scope.

Conduit will be installed to the new breaker, CVT junction boxes, and capacitor bank. A pull box is included to accommodate the runs to the capacitor bank.

### **Electrical:**

#### Capacitor Bank:

Relocate the capacitor bank to the new position shown on the electrical arrangement.

Relocate the following material:

- One (1) 32.4 MVAR capacitor bank
- One (1) 69kV potential transformer,
- One (1) equipment support tower
- One (1) Mark V circuit switcher # R2149
- One (1) "C" tower
- Three (3) high bus supports
- One(1) switch structure, 26 ft
- Three (3) fuse disconnect switches

#### Transformer Bay#1:

Install one CVT, one junction box, and three (3) surge arrester ion the existing AM tower in Transformer bay#1.

#### Transformer Bay #2

Extend the operating bus and add Transformer bay# 2 by installing the following material:

- Six (6) low bus supports
- One (1) AX2E tower with shield extension
- One (1) CVT & junction box
- Three (3) surge arresters
- Four (4) equipment supports
- One (1) Breaker, 115kV, 2000A, 40kA
- Two (2) disconnect switches, 115kV, 2000A, manually gang operated including one with ground.
- Two (2) switch support structures, type "CE" Tower
- One lot of insulators and buswork

### Relaying:

Breaker Protection/Control:

- Install one(1) Dual Breaker Control Panel The panel will use an SEL 351
- Install control cables to breakers.
- Install two (2) 115kV CVT
- Install two (2) 115kV Junction Box

Capacitor Bank Operator Switch/Control:

- Relocate one (1) Capacitor Bank/Motor Operator Switch
- Install control cables to Capacitor Bank.

Control House Equipment:

- Upgrade RTU and Termination Cabinet Status cards & Control cards
- Install one (1) Communications Processor, Orion 5r
- One Lot of Control Cable

### Long delivery items:

Quantity	Material Description	*Lead Time (weeks)
1	115kV Breaker	20
2	115 KV Breaker control panel	16
2	115 kV CVT	24
2	Disconnect switches	18
1 lot	Steel Structures	20
3	Arresters	16
1 lot	Insulators	14
1 lot	Buswork	14

**RTU configuration and settings:**

Settings for all new relays and surrounding area would be required as well as development of configuration for RTU for additional status, control and indications

**Construction methodology and outages required:**

Some grading and fence work will be required for the capacitor bank relocation. All work for the relocated capacitor bank should be completed first to limit outage time when connecting in new autotransformer. Foundation work for the capacitor bank should not require any outages. The bank can be moved without any outages but connecting in the new bus work will require an outage or clearance to the 115 kV transfer bus. Relay work will be required to make the relocated capacitor bank ready for service.

Foundation work on the new autotransformer bay cannot be performed until the capacitor bank is relocated. Then foundation work can be completed possibly requiring short outages to the existing autotransformer depending on final foundation design. Some electrical work can be completed without any outages. The new bay will be tied in during a concurrent outage with the existing autotransformer outage. Relay work will be coordinated with relay work in the 230 kV yard to get the new autotransformer energized. Then work to reenergize the existing autotransformer in the new bay can be completed.

**Assumptions:**

- Control house has adequate space for this installation.
- New capacitor bank location has adequate space to accommodate capacitor bank layout and without equipment damage.

**4.1.3 The Tie line connecting 115 kV of new transformer to 115 kV stations:****Scope:**

To build and connect aerial line between secondary of new transformer and 115 kV substation

**Design:**

In order to eliminate crossing lines, the tie between the new 230kV Auto deadend and the 115kV yard will be constructed as follows:

The tie between the existing 230kV auto deadend and the 115kV yard is a two span line running from the 230kV substation deadend to a three pole steel angle deadend structure to the 115kV substation deadend. The existing tie line will be relocated from the three pole deadend to a new single pole self supporting deadend that will be in line with a new bay to be constructed in the 115kV station. The new bay will be constructed in an area

currently occupied by a cap bank which will be relocated. The new tie will run from a new 230KV substation deadend to the vacated positions on the existing three pole deadend and then into the existing 115kV substation deadend position occupied by the existing auto tie. ACSR "Chukar" conductor will be used for all sections of the new line.

### Long Delivery items:

<u>Equipment</u>	<u>Quantity</u>	<u>Lead time</u>
Steel Pole	1	18 weeks
Insulators	21	16 weeks
Conductor	5500 lbs	18 weeks
Shield Wire	1000 ft	10 weeks

### Construction methodology, duration and outage requirements:

Outages to relocate the existing Auto tie line and to add the new Auto tie line will basically piggy-back with the necessary outages to complete the substation construction work. After the new 230kV Auto transformer bay has been built and the existing 115kV capacitor bank has been relocated, the transmission line work will be completed as described above in the design description. Total line construction duration will be approximately 2 weeks.

### Assumptions made:

- (1) No access issues
- (2) No outage issues

## 4.2 Build a 2<sup>nd</sup> Moril- Hopkins 138kV transmission line.

A 2<sup>nd</sup> Moril - Hopkins 138kV transmission line is required to eliminate the thermal constraints listed below. The new Moril-Hopkins 138kV line is to have a rated capacity of at least 288MVA.

<b>Limiting Element</b>	<b>Contingency Element</b>
Duboin-Bayou Warehouse 138kV Moril-Duboin 138kV Bayou Warehouse-Ivanhoe 138kV	Moril-Hopkins 138kV

### Scope:

The 2<sup>nd</sup> Moril – Hopkins 138kV line will be approximately .169 miles in length. The line will be comprised of 2 – guyed concrete dead end structures and 1 – concrete tangent structure. The dead end structures will be utilized at the Moril substation and at the line ownership point of demarcation where Entergy's ownership ends and CLECO's ownership begins. A 1272 ACSR Bitteren conductor will be used for this circuit providing 1304 amp rating and exceeding the 288MVA requested service rating. The structures will be direct embedded with compacted backfill.

**Transmission Line****Long Lead Items**

The following long lead equipment is required for this work:

<b><u>Equipment</u></b>	<b><u>Quantity</u></b>	<b><u>Leadtime</u></b>
Concrete Poles (9.5 ft Structures)	3 each	18 weeks
Line Insulators	15 each	12 weeks
1272 ACSR Bitteren Conductor	14,000 lbs.	22 weeks
7 No. 7 Shield Wire	1,000 ft.	10 weeks

*\*\*Lead times are as of January 2008*

**Assumption**

This estimate does not include the rebuilding the existing 138kV transmission line segment.

A CCN permit is not required, however exemptions may be required.

Final foundation and structure design will be based on survey results, soil borings, and loading conditions to assure compliance with Entergy design criteria.

**4.3 Replace breakers and switches at Ray Braswell:**

Replace existing J4928 and J4920 breakers by 3000A and 63kA interrupting capability. Also replace existing motorized switches J4919, J4921, J4927, and J4929 by 3000A rating.

**Site and Foundation:**

The foot print of the new breaker will not be the same as existing one. Breaker foundations will be modified to install the new breaker. New conduit will run from the existing cable trench and 4/0 copper shall connect to new beaker to the existing ground grid. Limestone will be required to restore ground disturbed by movement of vehicles and foundation work. Extra bus supports may be required between new breakers and breaker switches.

Assume that the existing grounding grid can sufficiently meet touch and step voltage requirements with the new fault current.

**Electrical:**

Replace the following breakers and switches:

- Remove existing breakers and external CTs
- Install Breakers: J4928 and J4920 (replace by 3000A, multi CT ratios, 63 kA, dead tank design)

- Install motorized switches: J4919, J4921, J4927, and J4929 (3000A)
- Install associated insulators, bus, connectors and hardware to match 3000A rating
- Install low bus supports if required.

### Long Lead Material – Ray Braswell 500kV Substation

Quantity	Material Description	*Lead Time (weeks)
2	500kV dead tank breakers	26
4	500kV switches	26

### Relaying:

The scope of this project is to replace two (2) 3000A 500kV breakers at Ray Braswell. The existing breakers are underrated and will be replaced with 3000A, 63KA breakers.

- Install two (2) 3000A 500kV breakers. Install new shielded control cables to each breaker. No control panels will be replaced during this project.
- Install four (4) 3000A 500kV motor operators. Install new shielded control cables to operators. No MOS panels will be replaced during this project.
- Kirk key Interlock between breaker & switches will need to be replace
- Control house equipment is adequate
- AC and DC panels are adequate
- Add points on S cards with accessories to the RTU
- A GE Harris D20 RTU will require a configuration package

### Long Lead Material – Ray Braswell 500kV Relay

Quantity	Material Description	*Lead Time (weeks)
	RTU cards	6 – 8

\* Lead time as of 2/05/08

- A. Relay Settings:** Work is required as the ratio for new breakers to be 3000/5.
- B. RTU configuration:** Some alarms may be added as a result configuration for new cards and reassignment of existing points may be required.
  - Ensure that the CT ratios are identified with over load rating to match with surrounding breaker associated existing protection to minimize the impact of changed breaker rating
  - Ensure that the control schematic and breaker control cabinet orientation aligns with the existing conduits
  - Design for extra alarms for RTU and develop edit sheet

**RTU configuration and settings:**

- Should the CT ratios be matched with the surrounding breakers, no changes in settings should be required for the surrounding line protection
- Revise Ray B – BW line protection settings corresponding to 3000A CT ratios
- Revise RTU configuration to accommodate additional breaker alarms

**Construction:**

An approximate nine to ten week outage will be required on the BWSES to Ray Braswell 500 kV line in order to replace the breakers, switches and associated bus and relay equipment. To minimize outage time, work will be performed at both substations concurrently. Separate crews will be working at each substation simultaneously. Foundations will have to be replaced as well and will be constructed during the outage time frame.

**4.4 Replace breakers and switches at Baxter Wilson:**

Replace existing J2230 breaker by 3000A and 63kA interrupting capability. Also replace existing motorized switches J2228, J2229, J2232, J2234, and J2249 by 3000A rating. Replace grounding switch K2283 to make 63 kA.

**Site and Foundation:**

The foot print of the new breaker will not be the same as existing one. Breaker foundations will be modified to install the new breaker. New conduit will run from the existing cable trench and 4/0 copper shall connect to new breaker to the existing ground grid. Limestone will be required to restore ground disturbed by movement of vehicles and foundation work. Extra bus supports may be required between new breakers and breaker switches.

Assume that the existing grounding grid can sufficiently meet touch and step voltage requirements with the new fault current.

**Electrical:**

Replace the following breakers and switches:

- Remove existing breaker J2230 and external CTs
- Install Breaker: J2230 (replace by 3000A, multi CT ratios, 40 kA, dead tank design)
- Replace motorized switches: J2228, J2229, J2232, J2234, K2283, and J2249 (3000A) (including one ground switch)
- Install associated insulators, bus, connectors and hardware to match 3000A rating

- Install low bus supports if required.

### Long Lead Material – Baxter Wilson 500kV Substation

Quantity	Material Description	*Lead Time (weeks)
1	500kV dead tank breakers	26
6	500kV switches	26

### Relaying:

The scope of this project is to replace two (2) 3000A 500kV breakers at Baxter Wilson. The existing breakers are underrated and will be replaced with 3000A, 63KA breakers.

- Install one (1) 3000A 500kV breaker. Install new shielded control cables to each breaker. No control panels will be replaced during this project.
- Remove four (4) 3000A 500kV CT. Install new shielded control cables to Breaker CTs.
- Install six (6) 3000A 500kV motor operators. Install new shielded control cables to operators. No MOS panels will be replaced during this project.
- Kirk key Interlock between breaker & switches will need to be replace
- Control house equipment is adequate
- AC and DC panels are adequate
- Add points on S cards with accessories to the RTU
- A GE Harris D20 RTU will require a configuration package

### Long Lead Material – Baxter Wilson 500kV Relay

Quantity	Material Description	*Lead Time (weeks)
	RTU cards	6 – 8

\* Lead time as of 2/05/08

- Ensure that the CT ratios are identified with over load rating to match with surrounding breaker associated existing protection to minimize the impact of changed breaker rating
- Ensure that the control schematic and breaker control cabinet orientation aligns with the existing conduits
- Design for extra alarms for RTU and develop edit sheet

### RTU configuration and settings:

- Should the CT ratios be matched with the surrounding breakers, no changes in settings should be required for the surrounding line protection
- Revise Ray B – BW line protection settings corresponding to 3000A CT ratios
- Revise RTU configuration to accommodate additional breaker alarms



**Construction:**

An approximate nine to ten week outage will be required on the BWSES to Ray Braswell 500 kV line in order to replace the breakers, switches and associated bus and relay equipment. To minimize outage time, work will be performed at both substations concurrently. Separate crews will be working at each substation simultaneously. Foundations will have to be replaced as well and will be constructed during the outage time frame.

Two week outages to the BWSES - Perryville 500 kV line and the BWSES East 500 kV bus as well as two weeks outages to the Ray Braswell – Lakeover 500 kV line and Ray Braswell 500 kV bus No. 2 will be required.

**5. COSTS**

The ICT has reviewed and determined each required upgrade will be considered a Supplemental Upgrade. For more information on cost responsibility for Base Plan and Supplemental Upgrades, see Attachment T to Entergy's OATT. The costs shown in the table include overheads and AFUDC, but do not include tax gross up that may apply to the project, current TGU rate is **31.677%**. The costs shown are considered to be accurate to within +/-25%.

**Projected Costs in 2008 dollars w/o escalation**

Description	Estimated Completion Year	Total Cost 2008
Add 2 <sup>nd</sup> Auto at Winnfield	Aug. 2010	\$9,422,203
New Moril – Hopkins 138kV Line	Aug. 2010	\$374,525
Upgrades to Ray Braswell S/S	Jan. 2010	\$3,486,297
Upgrades to Baxter Wilson S/S	Jan. 2010	\$2,672,102
Total with OH and excluding TGU		\$15,955,127

**ICT Cost Allocation**

Description	Base Plan Upgrade	Supplemental Upgrade	Total Cost 2008 dollars
New Moril – Hopkins 138kV Line		\$374,525	\$374,525
Add 2 <sup>nd</sup> Auto at Winnfield		\$9,422,203	\$9,422,203
Ray Braswell Substation		\$3,486,297	\$3,486,297
Baxter Wilson Substation		\$2,672,102	\$2,672,102
Total Projected Cost		\$15,955,127	\$15,955,127

## 6. SCHEDULE

A detailed schedule will be prepared subsequent to customer approval. The line upgrades are dependent on obtaining outages for the line work. If outages cannot be obtained or must be sequenced due to seasonal requirements, additional time will be required to complete the upgrades. The following are rough durations:

### Project Definition:

Includes surveys, soil borings, and Project Execution Plan 16 Weeks

### Substations:

Includes design, material procurement, and construction

- Add 2<sup>nd</sup> Auto at Winnfield 60 weeks
- Baxter Wilson 40 weeks
- Ray Braswell 40 weeks

### Transmission Lines:

- Moril - Hopkins 60 Weeks

Notes to Duration Schedules:

- All construction work requiring outages will be performed during off-peak load season. Line outages will be discussed with the SOC and TOC and the assumption is made that line outages will be executed as planned. However, last minute denial of outages by the SOC/TOC along with resulting schedule delay is possible.
- Transmission Line project will begin subsequent to Definition phase Project Execution Plan
- Schedule durations are high level estimates at this time. Upon project approval, a detailed schedule will be produced
- Based on duration schedule the upgrades identified for this Facility Study will not be 100%complete till August 2010, past the requested start date for this transmission service.

## 7. CONFIRMED RESERVATIONS

The following transactions were included in this Facilities Study:

OASIS		PSE	MW	Begin	End
250778	(delisting)	Entergy Services, Inc. (EMO)	1	7/2/1998	7/1/2011
392740		Ameren Energy, Inc.	165	4/12/1999	1/1/2009
569011		Entergy Services, Inc. (EMO)	242	3/1/2000	1/1/2014
731017		South Miss Electric Power Assoc	75	1/1/2001	6/1/2009

OASIS		PSE	MW	Begin	End
759196		Entergy Services, Inc. (EMO)	143	1/1/2001	1/1/2021
759294		East Texas Electric Cooperative	31	1/1/2001	1/1/2018
850304		Municipal Energy Agency of Miss	13	5/1/2001	6/1/2010
851493		Municipal Energy Agency of Miss	13	5/1/2001	6/1/2010
1024194	(renewal)	City Water & Light, Jonesboro	83	1/1/2003	1/1/2010
1024198	(renewal)	City Water & Light, Jonesboro	168	1/1/2003	1/1/2010
1084342		East Texas Electric Cooperative	50	1/1/2005	1/1/2009
1084344		East Texas Electric Cooperative	50	1/1/2005	1/1/2009
1084345		East Texas Electric Cooperative	75	1/1/2005	1/1/2009
1096986		Tennessee Valley Authority	73	9/1/2003	9/1/2013
1099991	(renewal)	City Water & Light, Jonesboro	83	1/1/2010	1/1/2016
1099997	(renewal)	City Water & Light, Jonesboro	168	1/1/2010	1/1/2016
1105665		Entergy Services, Inc. (EMO)	236	2/1/2003	2/1/2016
1105666		Entergy Services, Inc. (EMO)	91	2/1/2003	2/1/2027
1105668		Entergy Services, Inc. (EMO)	77	2/1/2003	2/1/2027
1126821		Entergy Services, Inc. (EMO)	101	5/1/2004	5/1/2029
1151106		Entergy Services, Inc. (EMO)	20	6/1/2010	6/1/2029
1161925		CLECO Power LLC (Gen)	12	8/1/2003	1/1/2010
1161927		CLECO Power LLC (Gen)	7	8/1/2003	1/1/2010
1161928		CLECO Power LLC (Gen)	7	8/1/2003	1/1/2010
1168061		Entergy Services, Inc. (EMO)	80	8/1/2004	2/1/2028
1168408		Entergy Services, Inc. (EMO)	247	8/1/2004	2/1/2028
1202470		NRG Power Marketing	91	4/1/2004	4/1/2009
1286481		Merrill Lynch Commodities	11	1/1/2000	1/1/2010
1289686	(delisting)	Entergy Services, Inc. (EMO)	1	6/1/2007	6/1/2030
1294132		Entergy Services, Inc. (EMO)	526	1/1/2006	1/1/2035
1309874	(renewal)	East Texas Electric Cooperative	75	1/1/2009	1/1/2017
1309875	(renewal)	East Texas Electric Cooperative	50	1/1/2009	1/1/2017
1309876	(renewal)	East Texas Electric Cooperative	50	1/1/2009	1/1/2017
1310448	(1284799) (delisting)	Entergy Services, Inc. (EMO)	1	6/1/2007	6/1/2030
1328125		CLECO Power Marketing	35	1/1/2006	1/1/2011
1340017		Plump Point Energy Associates	40	3/1/2010	3/1/2040
1340019		Plump Point Energy Associates	35	3/1/2010	3/1/2040
1340665		Entergy Services, Inc. (EMO)	200	1/1/2006	1/1/2009
1340673		Entergy Services, Inc. (EMO)	50	6/1/2007	6/1/2008
1346435		Entergy Services, Inc. (EMO)	100	6/1/2007	6/1/2008
1346437		Entergy Services, Inc. (EMO)	100	6/1/2008	6/1/2009
1346440		Entergy Services, Inc. (EMO)	200	6/1/2007	6/1/2008
1348508		CLECO Power Marketing	10	1/1/2006	1/1/2010
1352704	(1340032)	Plump Point Energy Associates	5	3/1/2010	3/1/2040
1356328		Municipal Energy Agency of Miss	40	6/1/2010	6/1/2040
1373643		City of Conway	25	3/1/2010	3/1/2040
1375299		Louisiana Generating LLC	11	3/1/2006	3/1/2013
1375300		Louisiana Generating LLC	8	3/1/2006	3/1/2011
1375301		Louisiana Generating LLC	5	3/1/2006	3/1/2011

OASIS		PSE	MW	Begin	End
1375559		CLECO Power LLC (Gen)	675	12/1/2006	12/1/2016
1380484		Osceola Light & Power	9	9/1/2009	9/1/2039
1381398		Constellation Energy Group	34	1/1/2006	1/1/2036
1381400		Constellation Energy Group	34	1/1/2006	1/1/2036
1381404		Constellation Energy Group	17	1/1/2006	1/1/2036
1381406	(1325187)	Constellation Energy Group	17	1/1/2006	1/1/2036
1383852		Arkansas Electric Cooperative Corp.	550	1/1/2007	1/1/2017
1385158		NRG Power Marketing	13	10/1/2007	10/1/2027
1385835	(1363730)	City of Prescott	22	4/1/2006	4/1/2009
1387272		CLECO Power LLC (Gen)	11	4/1/2006	4/1/2016
1389008		NRG Power Marketing	270	6/1/2007	6/1/2008
1393874		NRG Power Marketing	5	9/1/2006	9/1/2009
1401985		Constellation Energy Group	42	8/1/2006	8/1/2036
1406786		South Miss Electric Power Assoc	100	4/1/2010	4/1/2040
1407894	(renewal)	Morgan Stanley Commodities Group	102	1/1/2008	1/1/2009
1407895	(renewal)	Morgan Stanley Commodities Group	102	1/1/2008	1/1/2009
1408199		South Miss Electric Power Assoc	100	4/1/2010	4/1/2040
1408981		NRG Power Marketing	92	1/1/2007	1/1/2010
1410022	(1340037)	Constellation Energy Group	60	3/1/2010	3/1/2040
1422708	(delisting)	Entergy Services, Inc. (EMO)	1	1/1/2007	1/1/2027
1425495		East Texas Electric Cooperative	50	3/1/2010	3/1/2045
1431165		Cargill Power Markets, LLC	103	1/1/2008	1/1/2009
1435972		Entergy Services, Inc. (EMO)	150	5/1/2007	5/1/2010
1435973		Entergy Services, Inc. (EMO)	135	5/1/2008	5/1/2010
1437089		Arkansas Electric Cooperative Corp.	72 / 349	1/1/2007	1/1/2012
1440189		Arkansas Electric Cooperative Corp.	77 / 84	1/1/2008	1/1/2012
1440190		Arkansas Electric Cooperative Corp.	104	1/1/2008	1/1/2012
1442295	(renewal)	NRG Power Marketing	3	7/1/2007	7/1/2009
1442296	(renewal)	NRG Power Marketing	103	1/1/2008	1/1/2011
1442453		NRG Power Marketing	320	6/1/2007	6/1/2026
1448044		Entergy Services, Inc. (EMO)	3	1/1/2007	9/21/2009
1448054		NRG Power Marketing	103	1/1/2008	1/1/2009
1448057		NRG Power Marketing	103	1/1/2008	1/1/2009
1449494		Entergy Services, Inc. (EMO)	154	6/1/2007	6/1/2009
1449495		Entergy Services, Inc. (EMO)	322	6/1/2009	6/1/2059
1449881		Cargill Power Markets, LLC	103	1/1/2008	1/1/2009
1450222		American Electric Power	225	1/1/2008	1/1/2010
1452307	(renewal)	NRG Power Marketing	100	1/1/2008	1/1/2009
1452308		NRG Power Marketing	100	1/1/2008	1/1/2009
1452603		NRG Power Marketing	100	9/1/2007	9/1/2008
1453402		NRG Power Marketing	40	1/1/2009	1/1/2010
1456636		CLECO Power Marketing	10	10/1/2007	10/1/2012
1457947	(renewal)	Constellation Energy Group	6	6/1/2007	6/1/2008
1457949	(renewal)	Constellation Energy Group	70	6/1/2007	6/1/2008

OASIS		PSE	MW	Begin	End
1457988	(renewal)	Louisiana Generating LLC	2	6/1/2007	6/1/2008
1460898		Louisiana Energy & Power Authority	3	1/1/2009	1/1/2030
1460899		Louisiana Energy & Power Authority	5	1/1/2009	1/1/2030
1461442		Louisiana Energy & Power Authority	12	1/1/2009	1/1/2030
1464028		East Texas Electric Cooperative	168	1/1/2010	1/1/2040
1466197		NRG Power Marketing	206	1/1/2009	1/1/2010
1466561		Constellation Energy Group	28	1/1/2008	1/1/2009
1466562		Constellation Energy Group	25	1/1/2008	1/1/2009
1468113		Municipal Energy Agency of Miss	20	6/1/2011	6/1/2041
1470811		East Texas Electric Cooperative	186	1/1/2010	1/1/2040
1472304	(renewal)	South Miss Electric Power Assoc	75	6/1/2009	6/1/2011
1472315		South Miss Electric Power Assoc	100	6/1/2010	6/1/2011
1477069		Entergy Services, Inc. (EMO)	10	11/1/2007	11/1/2037
1477256		NRG Power Marketing	103	1/1/2008	1/1/2009
1479051		NRG Power Marketing	103	7/1/2008	7/1/2009
1480164		Entergy Services, Inc. (EMO)	725	1/1/2005	9/1/2033
1481170	(renewal)	Ameren Energy, Inc.	12	6/1/2007	6/1/2008
1483485		Entergy Services, Inc. (EMO)	100	1/1/2008	1/1/2011
1485805		NRG Power Marketing	103	7/1/2008	7/1/2009
1486898	(renewal)	NRG Power Marketing	100	9/1/2008	9/1/2009
1487076	(renewal)	Cargill Power Markets, LLC	103	1/1/2009	1/1/2010
1487084	(renewal)	Cargill Power Markets, LLC	103	1/1/2009	1/1/2010
1487880		NRG Power Marketing	300	1/1/2008	1/1/2010
1487892	(renewal)	NRG Power Marketing	100	1/1/2009	1/1/2010
1487893	(renewal)	NRG Power Marketing	100	1/1/2009	1/1/2010
1492216	(renewal)	NRG Power Marketing	92	1/1/2010	1/1/2025
1492223		Constellation Energy Group	22	1/1/2008	1/1/2009
1494443		Constellation Energy Group	35	1/1/2008	1/1/2009
1494445		Constellation Energy Group	75	1/1/2008	1/1/2009
1494446		Constellation Energy Group	75	1/1/2008	1/1/2009
1494450		Constellation Energy Group	25	1/1/2008	1/1/2009
1495910		Southwestern Electric	78	5/1/2010	5/1/2013
1498120		Constellation Energy Group	60	4/1/2012	4/1/2042
1498122		Constellation Energy Group	30	4/1/2012	4/1/2042
1498129		City of Conway	50	4/1/2012	4/1/2042
1499818	(renewal)	Merrill Lynch Commodities	85	11/1/2007	11/1/2008
1499819	(renewal)	Merrill Lynch Commodities	4	11/1/2007	11/1/2008
1499610		NRG Power Marketing	300	1/1/2008	1/1/2013
1500582	(delisting)	Entergy Services, Inc. (EMO)	1	1/1/2008	1/1/2038
1500584	(delisting)	Entergy Services, Inc. (EMO)	1	1/1/2008	1/1/2038
1502952		Arkansas Electric Cooperative Corp.	200 / 330	1/1/2008	1/1/2013
1503806		Constellation Energy Group	50	1/1/2008	1/1/2009
1503807		Constellation Energy Group	25	1/1/2008	1/1/2009
1505603		East Texas Electric Cooperative	10	1/1/2008	1/1/2010
1512518		Westar Energy	6	10/1/2007	10/1/2008

OASIS		PSE	MW	Begin	End
1514102		East Texas Electric Cooperative	29	1/1/2008	1/1/2017
1514104		East Texas Electric Cooperative	35	1/1/2008	1/1/2017
1514105	(delisting)	East Texas Electric Cooperative	1	1/1/2008	1/1/2017
1517005	(renewal)	NRG Power Marketing	103	1/1/2011	1/1/2026
1519357	(renewal)	Constellation Energy Group	100	1/1/2008	1/1/2009
1521210	(renewal)	NRG Power Marketing	5	9/1/2009	9/1/2010
1521266	(renewal)	MidAmerican Energy, Inc.	50	1/1/2008	1/1/2009
1521268	(renewal)	MidAmerican Energy, Inc.	50	1/1/2008	1/1/2009
1521269	(renewal)	MidAmerican Energy, Inc.	50	1/1/2008	1/1/2009
1521270	(renewal)	MidAmerican Energy, Inc.	50	1/1/2008	1/1/2009
1523070	(renewal)	NRG Power Marketing	100	9/1/2009	9/1/2010
1523071	(renewal)	NRG Power Marketing	100	1/1/2010	1/1/2011
1523072	(renewal)	NRG Power Marketing	100	1/1/2010	1/1/2011
1525148		Merrill Lynch Commodities	16	11/1/2007	11/1/2008
1525820	(renewal)	NRG Power Marketing	3	7/1/2009	7/1/2014
1526694	(renewal)	NRG Power Marketing	103	1/1/2009	1/1/2010
1527816		Westar Energy	6	10/1/2007	10/1/2012
1528112	(renewal)	Entergy Services, Inc. (EMO)	50	6/1/2008	6/1/2009
1528113	(renewal)	Entergy Services, Inc. (EMO)	200	6/1/2008	6/1/2009
1528114		Entergy Services, Inc. (EMO)	1523	1/1/2008	1/1/2038
1528115		Entergy Services, Inc. (EMO)	1039	1/1/2008	1/1/2038
1528116		Entergy Services, Inc. (EMO)	1834	1/1/2008	1/1/2038
1530287		Empire District	50	3/1/2010	3/1/2030
1530288		Empire District	50	3/1/2010	3/1/2030
1531163	(renewal)	NRG Power Marketing	103	7/1/2009	7/1/2010
1535503	(delisting)	Entergy Services, Inc. (EMO)	1	5/1/2008	5/1/2009
1535504		Entergy Services, Inc. (EMO)	485	5/1/2008	5/1/2009
1535867	(renewal)	MidAmerican Energy, Inc.	100	3/1/2008	3/1/2009
1545499		Louisiana Energy & Power Authority	6	4/1/2008	4/1/2009

**Pre-888 Transactions**

OASIS #		PSE	MW	Begin	End
1332606		East Texas Electric Cooperative	55	1/1/2006	1/1/2017
1412155		Entergy Services, Inc. (EMO)	1718	1/1/2007	1/1/2038
1412156		Entergy Services, Inc. (EMO)	741	1/1/2007	1/1/2038
1412158		Entergy Services, Inc. (EMO)	1867	1/1/2007	1/1/2038
1412160		Entergy Services, Inc. (EMO)	1142	1/1/2007	1/1/2038
1412161		Entergy Services, Inc. (EMO)	59	1/1/2007	1/1/2038
1412162		Entergy Services, Inc. (EMO)	148	1/1/2007	1/1/2038
1412163		Entergy Services, Inc. (EMO)	194	1/1/2007	1/1/2038
1412164		Entergy Services, Inc. (EMO)	1157	1/1/2007	1/1/2038
1412165		Entergy Services, Inc. (EMO)	1219	1/1/2007	1/1/2038
1412166		Entergy Services, Inc. (EMO)	683	1/1/2007	1/1/2038
1412167		Entergy Services, Inc. (EMO)	140	1/1/2007	1/1/2038
1412168		Entergy Services, Inc. (EMO)	456	1/1/2007	1/1/2038
1412169		Entergy Services, Inc. (EMO)	739	1/1/2007	1/1/2038

OASIS #		PSE	MW	Begin	End
1412170		Entergy Services, Inc. (EMO)	183	1/1/2007	1/1/2038
1412171		Entergy Services, Inc. (EMO)	64	1/1/2007	1/1/2038
1412172		Entergy Services, Inc. (EMO)	870	1/1/2007	1/1/2038
1412173		Entergy Services, Inc. (EMO)	129	1/1/2007	1/1/2038
1412174		Entergy Services, Inc. (EMO)	140	1/1/2007	1/1/2038
1412175		Entergy Services, Inc. (EMO)	130	1/1/2007	1/1/2038
1412176		Entergy Services, Inc. (EMO)	65	1/1/2007	1/1/2038
1412177		Entergy Services, Inc. (EMO)	947	1/1/2007	1/1/2038
1412178		Entergy Services, Inc. (EMO)	61	1/1/2007	1/1/2038
1412179		Entergy Services, Inc. (EMO)	304	1/1/2007	1/1/2038
1412180		Entergy Services, Inc. (EMO)	351	1/1/2007	1/1/2038
1412181		Entergy Services, Inc. (EMO)	692	1/1/2007	1/1/2038
1412182		Entergy Services, Inc. (EMO)	1641	1/1/2007	1/1/2038
1412183		Entergy Services, Inc. (EMO)	433	1/1/2007	1/1/2038
1412184		Entergy Services, Inc. (EMO)	1926	1/1/2007	1/1/2038
1412185		Entergy Services, Inc. (EMO)	946	1/1/2007	1/1/2038
1412186		Entergy Services, Inc. (EMO)	1233	1/1/2007	1/1/2038
1498278		Entergy Services, Inc. (EMO)	75	8/1/2007	1/1/2017
1498281		Entergy Services, Inc. (EMO)	86	8/1/2007	1/1/2017
1498283		Entergy Services, Inc. (EMO)	68	8/1/2007	1/1/2017
1498284		Entergy Services, Inc. (EMO)	78	8/1/2007	1/1/2017
1498285		Entergy Services, Inc. (EMO)	11	8/1/2007	1/1/2044
1498286		Entergy Services, Inc. (EMO)	69	8/1/2007	1/1/2044
1498287		Entergy Services, Inc. (EMO)	14	8/1/2007	1/1/2044

## 8. STUDY QUEUE

OASIS #		PSE	MW	Begin	End
1460876		Aquila Networks - MPS	75	3/1/2009	3/1/2029
1460878		Aquila Networks - MPS	75	3/1/2009	3/1/2029
1460879		Aquila Networks - MPS	75	3/1/2009	3/1/2029
1460881		Aquila Networks – MPS	75	3/1/2009	3/1/2029
1460900		Louisiana Energy & Power Authority	116	1/1/2009	1/1/2030
1468285		MidAmerican Energy, Inc.	103	9/1/2007	9/1/2008
1468286		MidAmerican Energy, Inc.	103	9/1/2007	9/1/2008
1468288		MidAmerican Energy, Inc.	103	1/1/2008	1/1/2009
1468289		MidAmerican Energy, Inc.	103	1/1/2008	1/1/2009
1478781		Entergy Services, Inc. (EMO)	804	1/1/2008	1/1/2058
1481059		Constellation Energy Group	60	2/1/2011	2/1/2030
1481111		City of Conway	50	2/1/2011	2/1/2046
1481119		Constellation Energy Group	30	2/1/2011	2/1/2030
1481235		Louisiana Energy & Power Authority	50	2/1/2011	2/1/2016
1481438		NRG Power Marketing	20	2/1/2011	2/1/2021
1483241		NRG Power Marketing	103	1/1/2010	1/1/2020
1483243		NRG Power Marketing	206	1/1/2010	1/1/2020

OASIS #		PSE	MW	Begin	End
1483244		NRG Power Marketing	309	1/1/2010	1/1/2020
1520043		Municipal Energy Agency of Miss	20	1/1/2011	1/1/2026
1543292		Constellation Energy Group	215	4/1/2009	4/1/2010
1543616		CLECO Power Marketing	17	1/1/2009	1/1/2011

## 9. ATTACHMENTS

### A. One Line Drawings

Description	
Winnfield Substation	L0444SO5
Ray Braswell Substation	M4160SO5
Baxter Wilson Substation	M3020SO5







